451 Alliance Winter 2015 *Global Digital Infrastructure Trends* Articles

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I. Six Disruptive IT Trends for the Coming Year

Disrupting the Balance of the IT World

It's a brand new year. So where and how is the IT industry going to be most affected by rapid technological change?

451 Research analysts have identified six key trends that are expected to be disruptive forces for the IT industry in the coming year: These "6 Cs of 2015" will also be the focus of upcoming 451 Research reports.

1. Containers

There is an explosion of activity around Docker and containerization, which has 451 analysts anticipating disruption in IT departments in 2015. While containerization technology has existed for years, Docker is a more modern, lightweight form that is widely viewed as a next-generation virtualization technology.

451 analysts believe Docker – which brands itself as “an open platform for distributed applications” – will be adopted by large enterprises to work alongside, as well as replace, traditional virtual machines (VMs) because of its management and efficiency advantages. Docker has not yet achieved parity with traditional VMs in certain critical areas, including orchestration and security, and a large number of vendors are rapidly addressing this.

2. Convergence

One of the most hotly debated areas in IT is the evolution of integrated IT platforms. Hyper-convergence has exploded, and we will see the first signs of meaningful adoption in 2015. Enterprises are being tempted by the promise of improved efficiencies from integrating compute, storage and networking processes, while vendors are being attracted by the potential to differentiate their product offerings.

Whether either of these expectations can be realized has yet to be seen. And we don’t yet know what the move to new market categories means for the IT marketplace. However, we know that vendors will have to change their approach to product delivery and their partner ecosystems, and customers will have to adjust their operations to gain the benefits of convergence.

3. Cloud Security

Security spending is up again. In 2015, mergers and acquisitions, IPOs, venture capital and private equity funding will continue at or near record levels. This is good news for the industry, but the underlying causes aren’t something to cheer about.

Security is in large part reactive: new tools emerge as IT architectures evolve. With the growth in enterprise IT and mobility, security will follow suit. Not only will new products come along to match IT developments and widespread vulnerabilities, but so will claims that they’re complementary to existing security products. The result: expect enterprises to pile on more layers in the coming year.

4. Closets

Demand for data and processing will continue to grow exponentially. But as the debate about Net Neutrality demonstrates, there are many technical and commercial constraints involved in accessing or delivering data over wide-area and public networks.

Part of the solution may lie with the micromodular datacenter – the next generation of server closet. These small datacenters bring processing and storage near the point of use and are delivered as complete, self-contained products.

Micromodular datacenters include IT capability (processing, storage and connectivity) coupled with the supporting infrastructure such as uninterruptible power, cooling, security and a complete management system. 451 Research expects micromodular datacenters to emerge as an important execution venue and outer “edge” industry tier.

5. Crowd Workers

The structure of the workforce and how people work is changing at a faster pace than companies' abilities to effectively manage that change.

Human resources systems that were conceived in the 1990s are showing their age because they weren't designed to deal with the multiplicity of emerging workforce structures. In 2015, we anticipate this disconnect will increase as workers become disassociated with the firms that employ them, whether because of increased mobility, remote working practices or the use of outsourced, freelance or crowd workers.

This will impact processes such as on-boarding and off-boarding, corporate communications, and time and task tracking.

6. Coexistence

The data management landscape is changing. Gone are the days when IT ruled data, metering it out to data scientists and analysts for reporting and analysis projects.

The rise of self-service data-preparation tools from a crop of startups is putting data management directly into the hands of analysts. As 2015 progresses, the number of do-it-yourself offerings for importing, cleansing, mapping, combining and transforming datasets will grow. Moreover, analysts will adopt them – as will data-savvy marketers and sales personnel.

Self-service data preparation and harmonization will complement and coexist with traditional IT data management tools, and continue to address critical issues around data security, compliance and governance.

The above "6 Cs" are some of the key trends that will be disrupting the IT industry in 2015. We will keep a close eye on them, and they'll be the subjects of 451 Research reports in the coming year.

II. New Survey Looks at Apple Pay and Reaction to iOS 8

451 Research's ChangeWave service recently surveyed 272 new iPhone 6 and 6 Plus owners about their initial impressions of Apple Pay and iOS 8. Here's what we found:

Apple Pay. Apple Pay is a key new feature available with the iPhone 6 and 6 Plus. ChangeWave's September consumer smartphone survey – which was completed one month prior to Apple Pay's launch – showed the mobile payment system had tremendous potential to be a game changer.

Now that iPhone 6 and 6 Plus owners have had some time to use Apple Pay, we asked about their experiences with the new mobile payment system.

One in five (19%) report they've already used Apple Pay, while another 63% plan to do so in the future.

Among those who have used Apple Pay, 77% say they're *Very Satisfied* and 19% *Somewhat Satisfied* – a strong rating for Apple's new mobile payment system.

Focusing on the types of transactions they use Apple Pay for, *In-store Purchases* (96%) tops the list. Other transactions include *Dining Out* (17%), *Online Purchases* (12%), and *In-app Purchases* (12%). We note that these results are likely to change as the number of participating merchants that accept Apple Pay continues to grow.

iOS 8. Three-in-five (59%) new iPhone owners say they're *Very Satisfied* with the iOS 8 operating system, and another 33% are *Somewhat Satisfied* – much higher than for other mobile operating systems in our consumer smartphone surveys.

We asked respondents which iOS 8 features they find most useful, and the enhanced *Keyboard* (47%) with predictive text was the top pick. Improved *Messaging* (31%) came in second, followed by *Camera* (28%).

III. 2015 Trends in Social Business Applications

The explosive growth of digital infrastructure has been well documented, but the impact on enterprises and how they manage ever-more-fragmented workforces and business processes has been less so.

In reality, digital infrastructure is creating as many new problems as it is solutions.

Leveraging the Power of Digital Infrastructure

Digital infrastructure is a reality today. But now that virtually anything can be accessed anywhere and at any time, enterprises are hitting obstacles as they attempt to control who can access what and where.

Here are three digital infrastructure trends that 451 Research is keeping an eye on in 2015 (click here for the complete 451 Report on this subject).

Trend 1: Shadow IT Will Drive Highly Ambitious Social Business Buying, But There is a Tech Disconnect

The explosion of bring your own device (BYOD), enterprise mobility and easy-to-provision cloud applications in recent years is fueling ever-more-ambitious visions of the 'extended enterprise.'

While the technologies exist to meet these ambitious plans, the ability to pull the parts together cohesively and manage the huge organizational changes that come with them is lacking.

At the same time, enterprise IT leaders are being challenged with an erosion of their ability to control and keep direct ownership of technology resources within their organizations. Business leaders are being equally challenged to control, manage and pay for a growing number of cloud-based subscription applications.

The next few years will see the continued planning and execution of major IT transformations. But the current technology market to support such transformations is inefficient and fragmented. We are heading from the tail (the tech market) wagging the dog (the enterprise buyer) to a situation in which the dog is taking back control.

Today, there are too many disparate vendors chasing tiny opportunities. Furthermore, there is a chronic lack of integration among vendors, as well as an almost complete disregard for real-world enterprise needs, standards and procedures.

While there are literally hundreds of vendors selling collaborative, social and communications technologies today, it's a disjointed and chaotic marketplace in need of consolidation. In short, the grand and worthy plans of future enterprise buyers remain out of alignment with the piecemeal approaches of the current tech community.

Recommendation

End users need to map out the true end state they are looking to achieve and what end-to-end support and care really looks like.

When it comes to assessing their technology investments, buyers need to look beyond traditional industry tech categories and keep a more open mind about what they'll need in the future. They also need to be realistic about the scale of change they are likely to undertake and get advice and support early to manage that change.

To move to true social business situations, some tough decisions need to be made about what is essential to getting business done and what is not. Buyers need to rethink everything from what data and content to secure to who to provide access to and *how people really do their jobs*, rather than how they are supposed to.

Trend 2: Increasingly Fragmented Workforce Structures Will Become Increasingly Unmanageable

Workers are becoming disassociated from the firms that employ them, whether because of increased mobility, remote working practices or a rise in the use of outsourced workers. This is impacting everything from on-boarding and off-boarding processes to corporate communications and time and task tracking.

The rapid changes we are seeing in the workplace have been driven in large part by technology advances, yet we see few solutions from the tech community for these serious challenges.

In short, the structure of the workforce and the way in which people work is changing at a faster pace than companies' ability to effectively control and manage that change. HR systems that were conceived in the 1990s and implemented throughout the past couple of decades are showing their age. They simply were not designed to effectively deal with the multiplicity of working structures that exist in typical organizations today.

At one end of the spectrum we see long-tenured positions falling away; at the other end, we see novel yet highly disruptive crowdsourcing gaining traction – including a new norm of transient employees, many of whom work remotely from their managers.

Recommendations

Companies need to move beyond BYOD. It's yesterday's problem, and the fact is workers are using their own devices whether they should or not. Enterprises need to embrace this and figure out strategies to communicate with them in their time, on their devices. Many, if not most, workers today have at least a smartphone that, among other things, enables more highly granular task management in the workforce interaction between businesses and employees.

Vendors must tie remote working and collaboration to measurable business activities. Simply enabling workers to work or collaborate remotely will not in and of itself bring business benefits. Buyers need to be able to not only enable but also manage day-to-day activities and tie them to measurable business activities; in many cases, this means existing systems of record and legacy business applications.

There are also lessons to be learned from the emerging world of crowd workers that can be applied more generally in the workplace, including the increased use of analytics along with broader task and micro task management.

Trend 3: Digital Commerce Will Lose Its 'E' and Become the Mainstream Way of Doing Business

Once seen as a niche concern, digital commerce (previously known as 'e-commerce') has been incrementally growing into the primary way in which revenue-based transactions are conducted, for consumers and businesses alike.

451 Research believes the march toward the primacy of digital commerce – driven in part by the drive toward automated marketing campaigns – will have huge implications for organizations (see Figure 1). Creating an organization that is able to integrate the greater customer experience into back-end systems that manage orders, fulfillment, manufacturing and accounting through systems of payment is likely to challenge even the most experienced company.

Recommendation

End users need to ensure they are integrating digital commerce not only technically, but organizationally with supporting applications. Success in digital commerce resides not in platform selection but rather with organizational capability – people, processes and technology should be the mantra.

And as digital commerce is likely to cut across a number of existing lines of business, understanding its impact to each while ensuring that it will provide a process improvement for all is a vital first step (as well as greatly informing any subsequent investment in the platform).

Once again, for more on 2015 Trends in Social Business Applications, click here.

IV. Strange Bedfellows: Apple and IBM Tackle Enterprise IT

An Unlikely Partnership between Apple and Big Blue

Earlier this year, former rivals Apple and IBM announced a partnership centered on business applications for iPads and iPhones. The relationship promised to reposition 'Big Blue' in mobile technologies and to build on the strengths of each company.

IBM is an enterprise software and services firm with a massive customer base of companies worldwide. Apple is an industry leader in hardware and devices, and it has garnered extraordinary satisfaction ratings from consumers, which, as 451 Research's ChangeWave surveys show, have carried over to corporate users, too.

Recently, the partners introduced the initial results of their efforts. The companies unveiled the first wave of 10 MobileFirst apps for Apple's iOS. The apps promise to provide greater

utility to customers in several verticals, including airlines, banking, retail, financial services and telecom.

IBM got its customers involved early in the process, and the results show a laser-like focus on solving particular problems in each industry. For example, an app to help commercial pilots better estimate how much fuel they'll need for a flight was developed in cooperation with IBM's corporate clients.

IBM's in-house development teams did much of the grunt work, relying on Apple for design expertise and to show its developers how to get the most out of iOS 8, reports TechRepublic.

The two companies intend to continue the process of building apps with the goal of uncovering new opportunities in the marketplace. As one IBM exec explains:

"We created a team to build these applications...a mixture of deep industry experts at IBM that understand business problems, current pains, needs of the industry. We coupled that with a design team staffed from Apple and IBM. [They] brought their designers to the table, [and] it's a great learning process."

Most importantly, this partnership starts off with a big advantage since Apple's iPhone and iPad already dominate the consumer markets – and corporate adoption is following a similar trajectory.

Here's a quick look at the latest ChangeWave findings on corporate smartphone and tablet buying.

Apple Leadership in Smartphones

A November 451 Research ChangeWave corporate survey shows Apple (77%) maintaining its leadership in business smartphone buying, climbing two points to a new high.

Samsung (35%) remains firmly in second place, but is down two points from the previous survey.

Meanwhile, buying plans for BlackBerry (15%) have declined four points to its lowest level ever in a ChangeWave corporate buying survey.

In terms of mobile OS preferences, Apple's iOS (75%) is the top choice among corporate buyers. Google's Android (38%) is in second place.

In-line with previous surveys, Apple is the overall satisfaction leader with 56% of iPhone business users reporting they're *Very Satisfied* with iOS.

Apple Dominates in Tablets, Too

Apple's dominance in corporate tablets is no less impressive. Seventy-eight percent (78%) of companies that plan to buy tablets next quarter say they'll purchase iPads – up five points since August.

Apple is also number one in corporate tablet satisfaction, with 63% of iPad business users reporting they're *Very Satisfied*. Microsoft (33%) remains second, narrowly edging out Samsung (31%).

In another promising sign for the Apple/IBM partnership, ChangeWave's latest IT spending survey shows Apple and IBM have industry momentum on their side heading into 2015. The survey registered a big jump in US business IT spending going forward . Simply put, it's the most positive Q1 outlook of the past seven years.

Overall, a very solid foundation appears in place for the Apple/IBM partnership to thrive. We'll be keeping a close eye on it during 2015.

V. AWS Is Shaking Up the Networking Industry

At a recent Amazon Web Services (AWS) analyst meeting, distinguished engineer James Hamilton provided insight on why and how Amazon is building its own switches and datacenter networking software.

His explanation went to the heart of the shockwaves that mega-scale cloud providers are sending across today's networking industry.

So why is Amazon building most of its own networking gear?

- **Cost Savings –** Amazon saves big time by buying network boxes directly from original device manufacturers (ODMs) rather than from traditional network equipment vendors.
- **Minimizing Delays and Increasing Capacity –** Building its own switches minimizes the delay in incorporating faster switch parts and increasing internal capacity.
- **Greater Reliability –** According to AWS, its homegrown switches are more reliable than traditional vendor switches, primarily because the software load is simpler.
- **Problem Solving –** Owning its own switch software has greatly accelerated AWS's problem identification and remediation.

The advantages of high volume

If you buy enough switches or servers and are responsible for their software, multiple benefits can accrue from building your own boxes.

AWS saves money by removing the network vendor – effectively the middle man – from the delivery chain. Just a few years ago, it wouldn't have been possible for a company to build its own switches because leading switch vendors such as Cisco designed and built advanced switch products only available in their own boxes.

More recently, many companies have started using 'merchant' parts, so a Cisco or Juniper top-of-rack datacenter switch is actually very similar to a 'white box' switch that is essentially being built from the same parts. In fact, most of the differentiation comes from the software that runs the switch, not in the components themselves.

In sum, neither server vendors nor network equipment vendors have factories anymore but, instead, use ODM contract manufacturers in Asia. So building your own switch today means working, for example, with Foxconn Electronics to build them rather than buying them from Cisco (which also contracts Foxconn to build them to its own specifications).

Importantly, buying them directly from an ODM in volume (which AWS and its peers certainly have) is cheaper than buying through a traditional vendor – and assures that the design is optimized for its specific use.

Industry-wide implications

Most of the large cloud providers – including Google, Facebook and AWS – have made the decision to build their own networks. A common motivation is to gain better control of their networks and to gain a better understanding of their traffic than had previously been possible with vendor systems.

The collective action of these cloud providers has clear implications for the networking industry. First and foremost, the availability of products from ODMs is making vendor-supplied equipment much less necessary. Unless something remarkable happens, most large-scale cloud operators are on the path of building and owning their networks rather than depending on the leading network vendors.

The result is a shakeup of the large network vendors – Cisco specifically – which will no longer be building the largest networks. This transformation is already having a profound impact on the development of new network technologies and architectures.

VI. Open Source Datacenter Management Gains in Popularity

Nearly every area of enterprise-class computing has an open source alternative, and datacenters are no exception. Since 2011, datacenter infrastructure management software (DCIM) has also had an open source option – **openDCIM**, a free, Web-based application.

OpenDCIM was launched primarily as an asset management system for datacenters to

track IT assets and equipment. Later releases added improved power monitoring and cable management, as well as better integration with other IT management systems.

At present, openDCIM downloads are averaging 150 a month, and about 120 organizations are subscribed to and using the software, including AT&T (Israel), DIRECTV (Latin America), the NASA Research facility, Red Hat (China), Oak Ridge National Labs, Vanderbilt University and the University of Hawaii.

Using openDCIM, subscribers are able to take the software, modify it and share it with others.

The Technology

OpenDCIM uses many common open source tools and components – and the Web-based interface can be used on any browser or device, such as a PC, iPad or Android smartphone.

As an asset management tool, it can provide complete physical inventory of the datacenter and record key details. Additionally, it supports cooling and power monitoring – pulling power data from IP-addressable power strips and distribution units.

While it has capacity-planning functions, it doesn't offer the analytic capabilities of some of the leading commercial packages. Moreover, it doesn't support the real-time environmental monitoring enabled by commercial DCIM systems.

Today, openDCIM has become much stronger visually (e.g., it supports pictures and video templates), and now has language support for English, Italian, French, German, Spanish, Slovenian, Chinese and Russian.

Strategy

OpenDCIM founder Scott Milliken considers openDCIM a pathway to commercial DCIM system use, and welcomes partnerships from commercial suppliers. To date, however, none have taken him up on the offer. Currently, openDCIM is being used by organizations with on-site IT and engineering capabilities that have a do-it-yourself approach to datacenter operations.

That said, the software has a growing number of functions, and there is increasing user interest – even though it isn't as user-friendly and polished as many commercial products have become.

Open source has never been for everyone – but for datacenters that have limited appetite for commercial software, that use their BMS for monitoring, and do not have complex business-integration and workflow requirements, openDCIM is an open and low-cost gateway to better-run datacenters.

VII. Non-Datacenter Owners: Not Pouring Concrete Anytime Soon

Non-Owners: Hanging Up their Hard Hats

Next week's 451 Corporate Datacenter survey report will take an in-depth look at enterprise datacenter trends. But the survey also produced key findings on behaviors of organizations that do not own datacenter facilities. Of the 900 respondents who participated in the survey, 384 fell into this category. Here's a brief look at what we found.

Non-Datacenter Owners

While they do not have their own datacenters, many of these organizations have server rooms or server closets to support their IT infrastructure, and they also make use of colocation, hosting and cloud service providers. Interestingly, more than one-third reported that they had, in fact, owned one or more datacenter facilities in the past.

Primary reasons for no longer owning their own facilities included cost savings and an overall movement to third-party providers such as cloud and colocation. Other respondents cited a preference for opex rather than capex, saying that they didn't believe owning a datacenter was part of their organization's core competency as a business.

Importantly, among previous owners, only 2% said they were 'Very Likely' and 4% 'Likely' to build a datacenter in the next two years.

Clearly, organizations that have never owned a datacenter or have shut down their facilities don't appear likely to get into the datacenter ownership business anytime soon. As one respondent put it, "Running a datacenter isn't our core business; service providers have much better levels of scale and skill."

Investing in IT infrastructure – Just Not Housing It

The survey showed IT spending for the average non-datacenter owner is still primarily allocated to IT infrastructure equipment (38%), and to a lesser extent facilities equipment (15%) used to support server rooms and closets.

But as the following chart also points out, colocation (18%) and hosting services (14%) are typically larger expenditures than software as a service (11%). Apparently, many enterprises prefer the level of control they maintain by owning their servers even as they use a colocation provider's datacenter space.

We note that among those that use colocation services, more than half reported outsourcing to a single colocation provider, while 24% said they used two and 20% said three or more.

Among those using hosting and public cloud services, 56% said they used two or more providers.

When asked to name their actual providers, Amazon led the list, but Microsoft surprisingly came in a close second. It appears that the Azure and Office 365 offerings are becoming increasingly popular services.

As Microsoft, Google, Rackspace and others add new features to their cloud portfolios, they are rapidly gaining market credibility. The survey shows these providers now pose a serious threat to Amazon's previously large lead in the IaaS market.

In sum, even as their IT needs expand, enterprises that don't own their own datacenters are moving toward colocation, hosting and public cloud suppliers – and appear unlikely to build their own datacenters anytime soon.

Keep your eye out for next week's 451 Corporate Datacenter survey report, which will take an in-depth look at current datacenter owners.

VIII. Growing Use of Mobile File Sharing and Synchronization Services

Demand for anywhere, anytime access to company files and data is driving up corporate use of file sharing and synchronization services.

A 451 Research ChangeWave survey recently asked 1,112 respondents about their companies' use of services in this key cloud area, and found 18% reporting their company uses paid mobile file sharing and synchronization services – up 3 pts since the previous survey in April and 5 pts higher than a year ago.

Does your company currently use paid mobile file sharing and synchronization services, or do you plan to begin using them in the future?

Another 4% say their company plans to begin using *Within the Next 6 Months*.

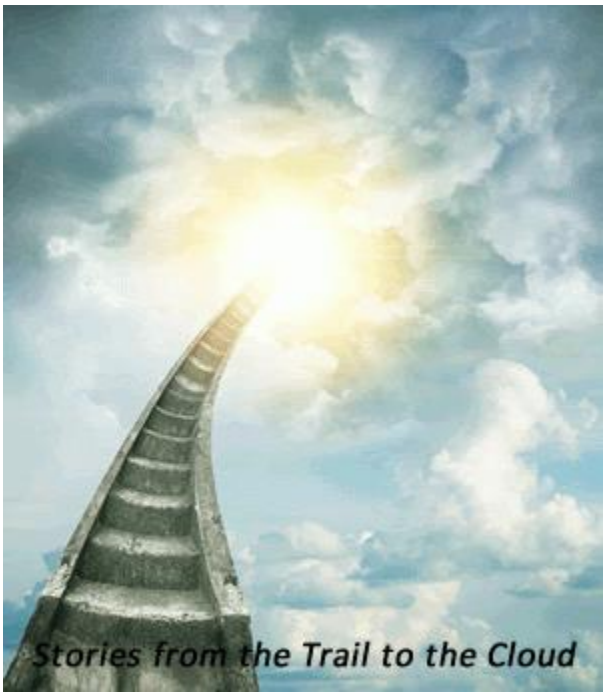
Off-Premises vs. On-Premises. Among companies currently using (or planning to use) paid mobile file sharing and sync services, 34% describe their platforms as Private – 19% *Off-Premises* and 15% *On-Premises* – double the level three months ago.

While one-in-four (25%) still say their file sharing and sync platform is being deployed as *Off-Premises Public Cloud*, that has plummeted 22-pts since April.

Security issues and more frequent data breaches are likely to blame here because the findings clearly show companies are becoming less likely to put sensitive corporate information at risk.

Dropbox (44%) remains the leading vendor for paid mobile file sharing and synchronization services. Microsoft OneDrive (27%) comes in second, closely followed by Google Drive (24%).

IX. The Trail to the Cloud: European Snapshot



Last month's 451 Cloud Computing Executive Summit in London focused on how the movement to cloud is transforming enterprise IT strategies.

Here are a handful of key takeaways – particularly with regard to cloud security, data control and the selecting of cloud service providers.

Controlling the cloud

Does the cloud control your organization, or do you control the cloud?

Data control typically dominated the internal discussion at the Summit when it comes to moving to the cloud. The same questions arose repeatedly: How secure is your data in the cloud? Who gets to access that data? Are the data files sufficiently segregated from those of other companies?

Data location was another key concern. Witness the UK-based bank that won't hold its customer data in any US datacenter. Particularly in Europe, countries are mandating that no data reside in datacenters outside their borders, impacting the use of multi-country cloud offerings.

With this in mind, many cloud providers have opened European datacenters to address national concerns around storing data outside local jurisdictions.

Of course, certain information is far too sensitive to store on public or community clouds. Consequently, classifying data to determine where it can and should go is a key activity being undertaken at many enterprises today.

As several Summit participants noted, the onus for this is on the customer. Cloud service providers aren't familiar enough with customer data to decide where it should go.

Pick a provider, any provider

Beyond data control, delegates discussed the range of characteristics they weigh when choosing their cloud providers. Here's a sampling of the wide variation in how enterprises go about finding the ideal provider.

- One organization – based in the North East UK – prefers to work exclusively with local service providers. It likes them to be close-by, both for better customer support and in order to support local business.

  Keeping its cloud providers local means faster response times – even though it is working with smaller providers. It also benefits from being treated as a major account, instead of being seen as just one of hundreds of smaller accounts with a much larger international provider.

- Conversely, global reach is the critical need of one major international publisher. As a media company publishing on a global scale, locality didn't enter into its equation when choosing a cloud provider.

  This publisher has moved many of its functions to the cloud, yet was originally concerned about the reliability of the 99.9% uptime service agreement it was offered. But having experienced no problems to date, it has ditched its original view that cloud delivery is inherently unreliable.

  Unlike companies in, say, the financial services industry, this company doesn't have significant compliance rules and was, therefore, able to consider a long list of potential cloud suppliers. After testing a handful of global services, it was able to move to best location environments for its various workloads.

- For a French waste management company, cost issues proved king. While moving to the cloud meant 12 months of internal suffering, that was far less disruptive than what would have otherwise been a seven-year IT implementation project.

  In other words location, company size, or a provider's underlying infrastructure weren't the top deciding factors here. Armed with a proper business plan for cloud migration, it headed to where the cost was right and the service easy to manage.

The journey to the cloud is far from one-size-fits-all. With every unique organization come a slew of unique expectations, challenges and vendor relationships – all of which can impact the move to the cloud.

X. Black Swans of the Security Industry

Is there a short list of 'black swan' turning point events that – if they occur – can cause massive, disruptive changes in the security industry?

From the 451 Research perspective, security today is largely a reactive industry that tends to evolve slowly in response to changing IT practices and demands.

Really significant change, however, is often spurred by rare and random events.

A 'Black Swan' Turning Point?

Here's a look at some key 'black swan' events that could radically shake up the security industry:

Cyber-war

One of the more highly discussed possibilities is cyber-war, and many countries may already be preparing for one.

If we assume a cyber-war would be a widespread, sustained event that affects general businesses and populations – one that is more targeted and attributable than today's cyber-attacks – then security vendors will almost certainly step up their technology development and marketing to defense agencies and contractors.

Vendors with a multinational presence may find themselves dealing with fault lines in their deployment, as nation-states pull further apart. The provenance of your company's security technology will become a much greater concern.

Natural Disasters

Availability is a key factor in security.

There are many instances where cascading failures within one business can affect its customers, and where regional disasters can take out local infrastructure.

But a really big disaster that cuts across multiple public cloud datacenters, telcos, or other network and hosting providers, could change the practice of siloed security, where it's normally ‘every organization for itself.’

A widespread, long-term outage that requires organizations to temporarily move to new hosting providers would, for example, mean that these new tenants would have to adopt the existing security infrastructure and practices in place there. Consequently, security portability would suddenly become a very hot topic.

Cyber-Terrorism

Cyber-attacks have already been launched that could be labeled as terrorism, depending on your point of view. The 2010 Stuxnet virus, for example, was a deliberate attempt to destroy the nuclear capabilities of a nation.

A terrorist cyber-attack that was clearly attributable, with the purpose of terrorizing a specific population, would once again change dynamics within the security industry.

Both enterprises and consumers would focus on those security technologies that offer the most promise of protection, and users would place high demands on vendors to fulfill those promises. Terrorist attacks resulting in widespread, cross-vertical outages would likely provoke the same changes as those for a natural disaster.

Cascading, Cross-Provider Failures

As infrastructure becomes more interdependent, it also becomes more vulnerable to cross-provider failures.

Cascading failures across providers suddenly become possible, even when they aren’t a product of a natural disaster, but simply a ‘perfect storm’ of programming errors and unnoticed fragility. A domino effect of provider outages could lead to a greater examination of shared infrastructure dependencies.

Such vulnerabilities are already making headlines – the 2014 Heartbleed bug in OpenSSL, for example – since they affect organizations globally.

These vulnerabilities could become a much bigger problem if an exploitable flaw is used to start a chain of denial-of-service (DoS/DDoS) events across multiple providers.

Liability Legislation

Similarly, the impact of any legislation that increases the liability of organizations or security vendors would be profound. The ‘good’ news is that the nature of such legislation would probably be limited (by nation, region, industry or technology) – but if successful, it could spread.

In the litigious United States, for example, the cost to security providers could skyrocket – not just because of increased insurance premiums, but in technology and user-interface design as well.

Making security products more objectively 'efficacious' and 'foolproof' than they are today will take a lot of work. Moreover, doing so might slow down the development of startups in the security industry as smaller companies quickly seek shelter with larger ones that can afford to defend against lawsuits.

Most of these 'black swan' scenarios focus on availability as a core component. While there are other disruptive events that could change requirements for integrity and confidentiality, we don't see them as being as catastrophic.

While the Snowden leaks caused lots of discussion and hand-wringing, they haven't yet led to wholesale changes in the security industry. But we believe significant change can and will be spurred by rare and random events, many which are likely to center around availability.

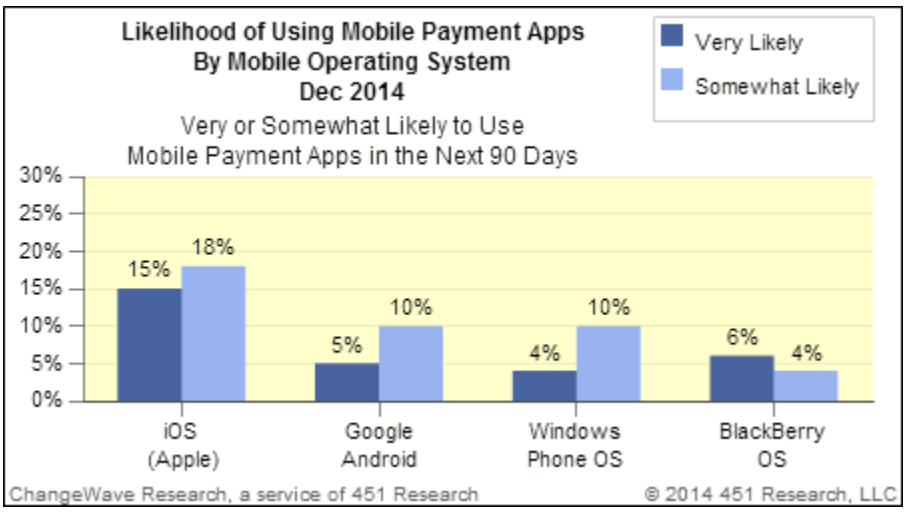
XI. Mobile Payment Apps: Who's Leading the Pack?

Back in September, a 451 Research ChangeWave survey showed Apple Pay would have an enormous impact on the mobile payments market – and this was before it had officially launched.

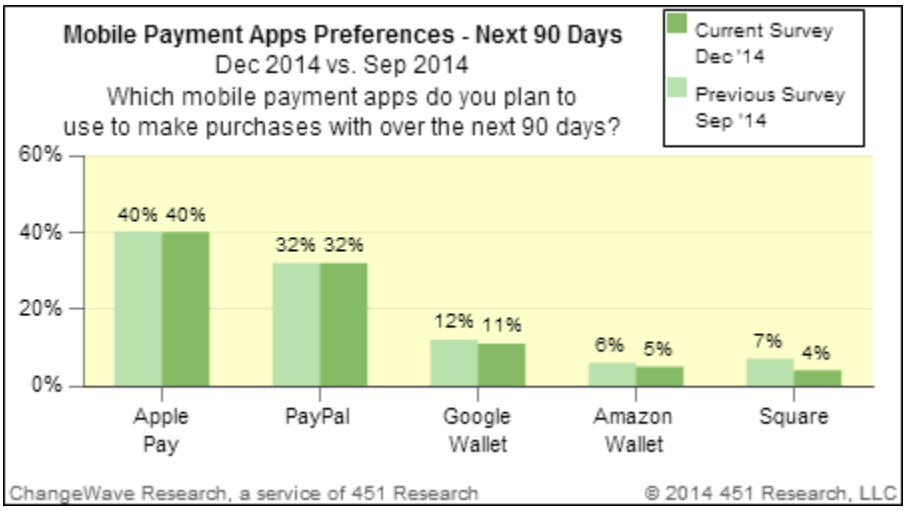
With the new Apple service now having been available for several months, ChangeWave recently surveyed 4,126 primarily North American consumers about their planned use of mobile payment apps.

The survey shows that interest remains strong, with one in four (24%) smartphone owners saying they're likely to use mobile payment apps over the next 90 days (10% *Very Likely*, 14% *Somewhat Likely*).

As seen in the previous survey, iOS users (33%) remain significantly more likely to use mobile payment apps than users of Android (15%), Windows Phone OS (14%) or BlackBerry OS (10%).

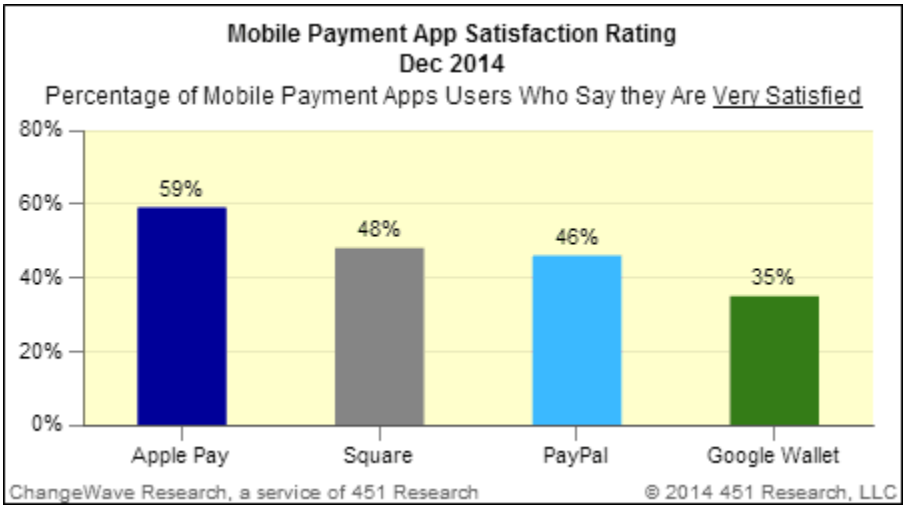


And among those planning to use mobile payment apps over the next 90 days, Apple Pay (40%) remains the number one choice – unchanged from September.



PayPal (32%) is in second place, unchanged from previously, while Google Wallet (12%) and Amazon Wallet (5%) are both down 1 pt.

Looking at satisfaction ratings among consumers who have already used mobile payment apps, Apple performs best with 59% of those who have used Apple Pay saying they're *Very Satisfied* with the new service. Square (48%) narrowly edges out PayPal (46%) for second place, followed by Google Wallet (35%).



Perceptions of Security. The survey findings show that security is of critical importance when it comes to consumer acceptance of mobile payment technologies:

- When mobile payment users were asked which features are most important to them in a mobile payment app, *Secure Storage of Financial Account Information on the Device* (84%) is still the overwhelming top choice, even ahead of *Widespread Acceptance Among Merchants* (64%).

- Moreover, *Security Issues* (47%) ranks as the number one reason given by respondents who say they're unlikely to use mobile payment apps.

Importantly, when respondents were asked if they consider mobile payments to be more or less secure than traditional credit cards, we find continuing improvement in the perception of mobile payment security.

Do you think mobile payments are currently more or less secure than traditional credit cards?

	Current Survey Dec '14	Previous Survey Sep '14	Previous Survey Mar '14
Significantly More Secure Than Traditional Credit Cards	6%	5%	2%
Somewhat More Secure Than Traditional Credit Cards	16%	16%	12%
Somewhat Less Secure Than Traditional Credit Cards	16%	19%	26%
Significantly Less Secure Than Traditional Credit Cards	12%	13%	17%
Don't Know	51%	46%	43%

Better than one in five (22%) now believe mobile payments are more secure than traditional credit cards (6% *Significantly More*; 16% *Somewhat More*). On the other hand, 28% think they're less secure (16% *Somewhat Less*; 12% *Significantly Less*).

All told, perceptions of mobile payment security have improved a net 5 pts just since September.

XII. SMB Cloud Adoption Barriers: A Rock and a Hard Place

What barriers do SMBs face in moving to the cloud?

A recent workshop put on by the UK's *IT as a Utility Network+* and *ServicesToTheCloud* initiatives looked at this question and found one thing to be startlingly clear:

While larger enterprises have the resources to use cloud and startups tend to have the agility, SMBs often find themselves stuck between a rock and a hard place.

Unlike large enterprises, SMBs can't afford the in-house teams to develop cloud-native applications or the budgets to pay for outside consultants. On top of that, they don't usually have the buying power to gain additional support from service providers.

Of course, SMBs want to be more agile, but unlike startups that have no legacy technologies or processes in place, they often don't have the flexibility to get started quickly and rapidly tailor their organizations to the cloud.

We note that the *IT as a Utility Network+* and *ServicesToTheCloud* initiatives are meant to unite technology researchers, vendors and end users with the goal of promoting cloud access and the development of new technologies.

The workshop looked at tools for promoting easy cloud deployment, integration and assessment, as well as the use of low-cost help and technology transfer to access best practices.

The Challenge for SMBs

The cloud-adoption challenge for SMBs presents a unique opportunity for cloud service providers.

Generally speaking, there are two predominant cloud sales models: *lower-cost self-service* and *higher-end presales engagement*.

Lower-cost self-service is great for startups that can build their own cloud apps without greatly impacting their internal organizations. The model is mostly low-touch for service providers and, therefore, low-cost.

Higher-end presales engagement is great for larger enterprises looking for trusted advisers, but is much more costly for service providers. They normally provide this level of support only where they'll get the largest return.

So where is the happy medium for SMBs?

It may lie in a model where SMBs can both design and implement their own cloud applications and access integration tools that can modify cloud architectures to their choosing.

When such capabilities are backed up with qualified advisers willing to charge by the day or even the hour, it then becomes a win-win for SMBs that can harness the necessary support to optimally access the cloud.

As one attendee put it: "The cloud requires new skills, and SMBs aren't always in a place to acquire these resources easily, but there are tools that can provide assistance."

Other workshop attendees pointed out that the cloud service providers themselves should reach out to SMBs in order to inexpensively help them escape the hard place they may find themselves.

SMBs should seek the midpoint where they can design and implement their own cloud applications, but are provided the necessary tools by their cloud providers. This will help give SMBs the confidence and support they need to successfully move to the cloud.

XIII. Docker: A Platform as a Service Innovator?

Even as Docker container technology is in the process of defining its identity, it's contending with a sudden rise in popularity.

Docker Inc, the company behind the technology, recently announced its key product roadmaps at a European conference. The technology promises at least two use cases:

- An alternative way of virtualizing workloads on servers using underlying containerization technology.

- A DevOps-friendly way of packaging applications for deployment on cloud infrastructures.

Originally, many analysts were fixated on the first of the above use cases. However, as Docker has evolved and adoption has increased, it is becoming clear that the second use case is perhaps the more interesting promise long term. In other words, Docker is now looking more like a PaaS innovator.

Docker as PaaS

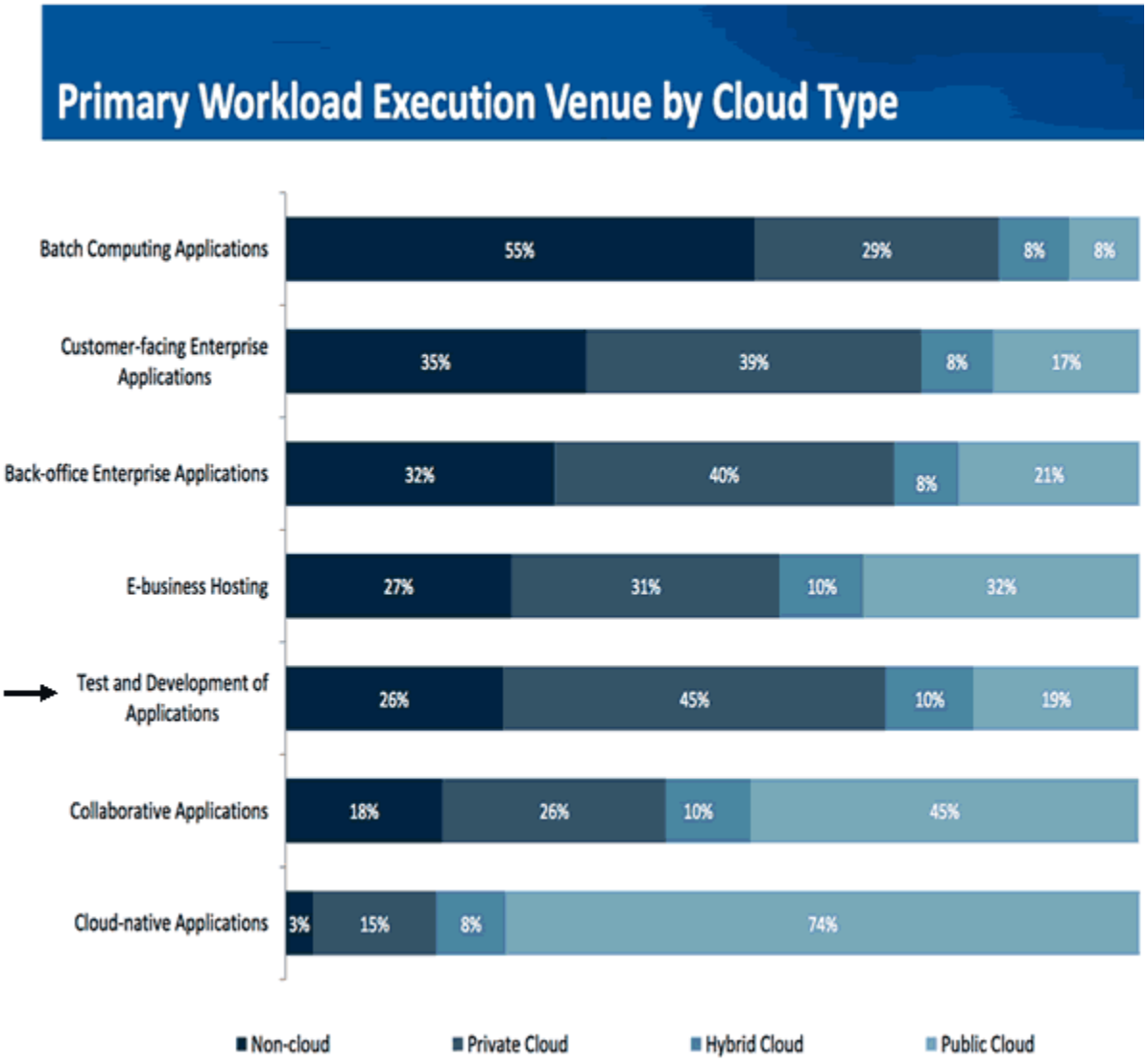
A key theme at the European conference was how the Docker platform is central to the Docker-as-PaaS strategy.

The focus is on microservices architecture, where complex applications are composed of small, independent processes communicating with each other. Essentially, DevOps developers are using microservices architecture on the Docker platform to support rapid software delivery.

451 Research studies consistently show tremendous corporate interest in speeding up their application release cycles, which helps account for the wide interest in DevOps.

Moreover, ‘the developer workload’ is one of the dominant uses of cloud, and Docker's emphasis on developers lends further support to this.

Indeed, as a recent 451 Research study shows, supporting developers’ workloads (development and testing of cloud-native applications) is now one of the most popular uses of cloud:



Despite this, the PaaS market remains relatively small compared to other cloud markets. While we don't track the private PaaS market, 451's Market Monitor puts the 2014 public PaaS market at $2.13bn, growing at a 26% CAGR to $5.65bn in 2018.

Compare this to the IaaS market, which Market Monitor puts at $7.06bn in 2014 and $17.64 in 2018, growing at a 28% CAGR. As a further comparison, we predict the Hadoop market (including both on-premises and 'as a service') will be $2.71bn in 2018.

Countless keyboards have been torn up explaining why PaaS hasn't fully taken off yet. In short, PaaS hasn't fully caught on with the general developer compared to, say, previous developer stacks such as Java application servers.

Anecdotally, developers are telling us that they prefer to build their own stacks, likely due to fear of 'lock-in' but also because, well, developers like to tinker.

They do, however, want the speed and agility that they see in PaaS offerings and are always looking for greater efficiencies in their application development stacks.

In terms of PaaS approaches such as Docker that emphasize a **component** rather than a **finished-platform** approach, we believe they can grow the PaaS market. We will be watching Docker over the next 12 months (along with other platforms such as Cloud Foundry) to see whether the component-based PaaS approach – call it 'Do It Yourself PaaS' – fully catches on.

XIV. Critical Security Flaws Leave Datacenters Vulnerable

Just how secure is your datacenter?

451 Research was recently invited to witness firsthand how easy it is for a hacker to gain access to and control the critical infrastructure of a datacenter – including its power, cooling and management systems.

We were skeptical. Sure, there are security flaws in many information systems that can easily be demonstrated, but they're also well understood.

Even so, the demonstration proved disturbing, both because of the ease of penetration and the number of critical management resources that could be located and accessed via the use of a few basic tools.

Once accessed, it became possible to reset critical functions such as power thresholds, alarm settings or even passwords.

The demonstration confirms growing evidence that major incidents involving physical infrastructure equipment are likely in the near or medium term.

So how are hacks like this carried out?

Using an anonymous and untraceable Web browser, the hack began with a search on the website Shodan, billed as the Google for hackers.

The initial search returned thousands of devices – such as power distribution units (PDUs) and uninterruptible power supplies (UPSs) – which we were able to narrow down to those of a certain type. This group was then further refined in a secondary search – for those device types that were poorly password protected.

It should be noted that there is a level of expertise required in identifying devices, but the equipment is easily discoverable by datacenter and security experts and experienced hackers alike.

After that, the final stage is easy. By entering the device's IP address into a Web browser, access can be gained and the hacker can control the device remotely or use it to gain unprotected backdoor access to a company's network.

Context

The opportunity for critical infrastructure to be compromised and subject to cyber-attacks is real, although not widely publicized.

While corporate IT networks and equipment are often protected and firewalled (if not always adequately), this is often not the case with infrastructure equipment – which makes it a dangerous, open backdoor.

The permeation of 'smart' technology into the datacenter has created an exponential growth of devices typically given free rein to communicate within an internal network. Left unchecked, they can provide unauthorized access to critical infrastructure.

The hack described above was a simple example, and only one of many vulnerabilities. In addition to the influx of smart devices, building management systems (BMSs), which have long been a fixture in datacenter operations, and datacenter infrastructure management (DCIM) systems are also being exposed as security risks.

With minimal focus on network security for these technologies, the opportunity for manipulating critical infrastructure is growing. The consequences for such security breaches are significant.

California-based security firm Cylance reports that the Iranian government recently hacked 50 organizations from 16 countries; 10 of those organizations were in the US. Among those targeted: a major airline, an energy company specializing in natural gas, a large defense contractor and a major military installation.

With the risks so high, the question remains: How and why are such glaring security vulnerabilities left unchecked?

For example, the Simple Network Management Protocol card is an innocuous device with glaring security flaws.

SNMP is an Internet Protocol developed in the 1980s as a way to simplify network management. It is used to collect information from and configure network devices, such as servers, printers, hubs, switches and routers on an IP network.

Today, SNMP cards are also widely distributed in PDUs, UPSs and various cooling equipment.

SNMP is inherently insecure because SNMP messages are not encrypted. A hacker isn't able to access a device because the SNMP card is faulty – they gain access because the card allows it.

SNMP can be used to manage devices – for example, to shut down a single UPS unit or possibly an entire network. This makes an SNMP card a dangerous tool for hackers.

With companies spending millions of dollars on power infrastructure, it is hard to imagine why issues such as this one aren't getting more attention from vendors.

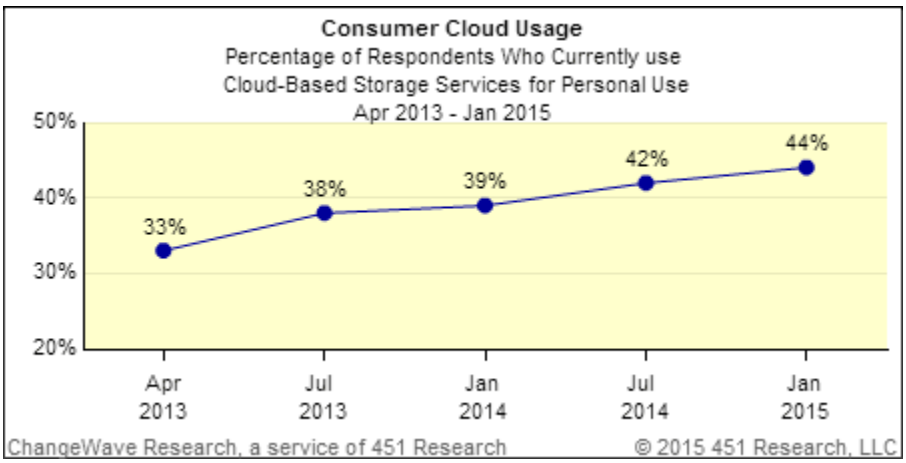
A possible explanation could be the difficulty in updating critical infrastructure systems. Suppliers need to plan out their developments over years, due to differing standards in multiple countries and the wide variety of systems that have to be taken into account.

Nonetheless, the opportunity to develop products for the nascent infrastructure security market is as immense as the threats that suppliers should be protecting datacenters against. We believe the issue of critical datacenter security flaws is a significant one, requiring serious and immediate attention.

XV. Storage Wars: A Look at the Top Consumer Cloud Services

The ubiquity of mobile devices is leading to widespread consumer adoption of cloud storage services, according to a January 451 Research ChangeWave survey of 2,022 US consumers.

The survey took a close look at the consumer cloud market, including current usage and the competition among storage providers. The results show demand remains strong, with 44% of consumer respondents saying they're currently using a cloud-based storage service – up 2-pts from the previous survey in July.

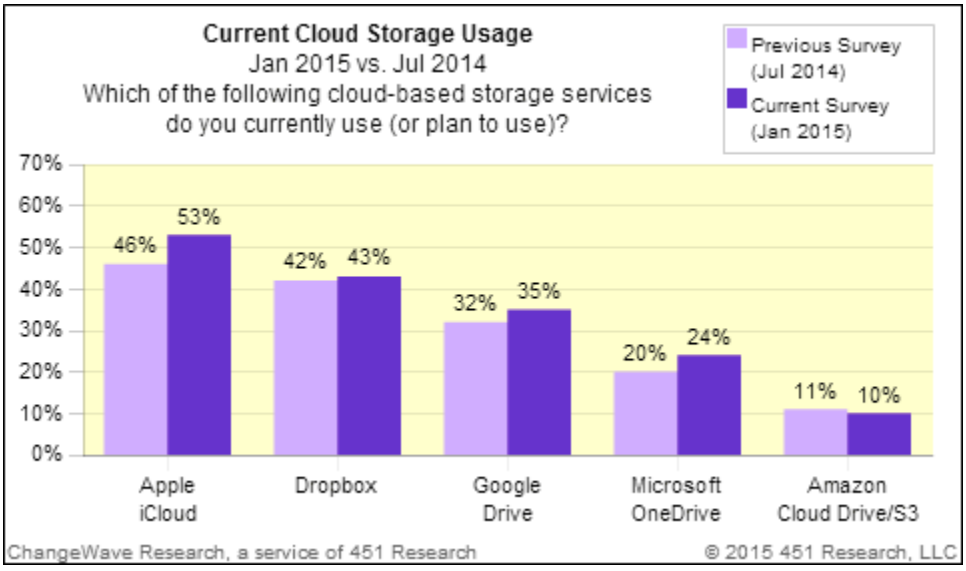


Another 5% say they plan to begin using cloud storage services over the next six months.

While the big players – Amazon Cloud Drive/S3, Apple iCloud, Dropbox, Google Drive and Microsoft OneDrive – are all battling fiercely in the enterprise market, they've also devoted considerable resources to capturing share of the burgeoning consumer space.

The strategies for consumers versus businesses are obviously very different. Generally, consumers sign up for free, and the service providers encourage users to store enough data on their servers that the customers have to upgrade to premium services. Advertising remains a second revenue stream that Google is best suited to exploit.

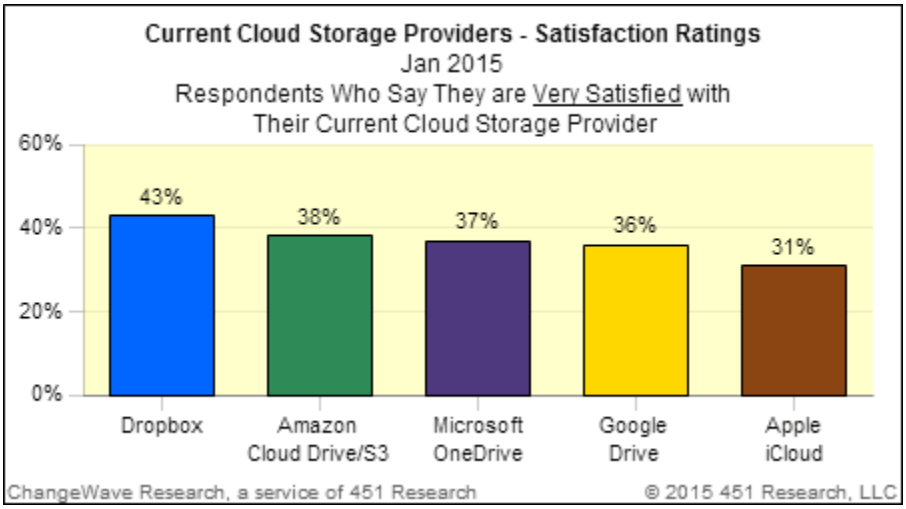
Among current and planned users of cloud-based storage services, Apple iCloud (53%) remains the top consumer choice – and it's showing the greatest momentum since the previous survey in July (up 7-pts).



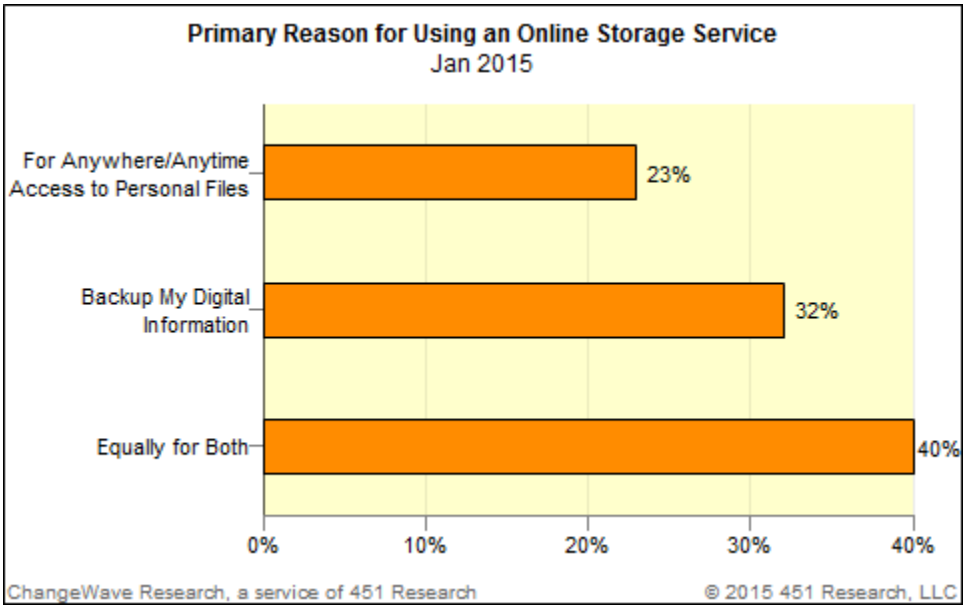
Dropbox (43%; up 1-pt) is second, followed by Google Drive (35%; up 3-pts) and Microsoft OneDrive (24%; up 4-pts).

Customer Satisfaction With Cloud Storage Services. Interestingly, Apple iCloud actually trails the pack in customer satisfaction, with 31% saying they're *very satisfied*.

Dropbox leads with 43%, followed closely by the other top providers – Amazon Cloud Drive/S3 (38%), Microsoft OneDrive (37%), and Google Drive (36%).



Primary Reasons for Using Cloud Storage Services. One-in-three (32%) cloud users say their primary reason for using online cloud-based storage services is *To Backup Digital Information*. Another 23% say *Anywhere/Anytime Access to Personal Files*, and 40% say *Equally for Both.*



Consumer Perceptions of Cloud Security. ChangeWave also looked at how consumers feel about security for cloud storage services, and the survey found that perceptions have worsened since July 2014.

The percentage who believe such services are secure fell 4 points since July to 54% (8% *Very Secure*; 46% *Somewhat Secure*).

Clearly, the headlines about state hacking, celebrity photo stealing, retailers' credit card theft, and the rest are weighing on the psyches of consumers and raising questions about security of cloud storage providers.

If the primary competitors in this segment want to succeed, the best strategy is to raise their security standards far higher than anything consumers can manage on their own.

XVI. Dark Secrets of the SLA

Many enterprises think of service-level agreements (SLAs) as a form of protection, ensuring that a given service performs as required and that the enterprise will be compensated if and when things go wrong.

Actually, most SLAs are heavily stacked in the provider's favor. It's the enterprise that needs to plan for problems – whether it be downtime, poor performance, security breaches or data loss – because it's the enterprise that will ultimately pay the price.

SLAs are, in reality, marketing tools: guarantees to give customers faith that the service provider can deliver, along with service credits to make them believe they can 'punish' the provider if the provider lets them down.

Regardless, service providers structure their SLAs so they have much to gain and little to lose.

Why do service providers even offer service credits?

If the purpose of a guarantee is to instill faith in a potential customer, what is the purpose of service credits?

While an optimistic observer may think it's to compensate end users for their loss, that's usually not the case. The credits refunded by a service provider are rarely enough to fully compensate loss – limited liability waivers set a cap on the maximum refund possible.

As a result, if a website goes down on Black Friday, the cost of the downtime far exceeds the cost of the IT service, along with any service credits obtainable from a provider.

Typically, liability will be capped at the total amount paid by the consumer to the provider.

Of course, additional insurance can sometimes be used to offset the risk and provide compensation in the event of the unexpected. But the real reason most service providers offer service credits is to make enterprises believe they can effectively 'punish' the service provider for nondelivery – even though that's rarely the case.

This all seems like bad news for end users

While SLAs do provide a level of comfort to end users, no service provider takes massive risks in promising customers refunds if it doesn't think it can control those risks.

In sum, enterprises will buy SLAs for the comfort factors, but it is ultimately the CIO who is responsible for building resiliency and planning for downtime.

Outages are going happen occasionally, regardless of what you do – sometimes 'black swans' arise – but it's important to keep the risk of outages as low as possible. SLAs are only one part of an enterprise's much larger risk/cost/benefit analysis.

Yes, SLAs can provide an indication of a service provider's performance, but in the end, the risk of downtime, poor performance, security breaches and data loss are almost always born by the enterprise. End users should evaluate those risks against the costs and plan accordingly – regardless of the so-called 'safety net' provided by SLAs.

XVII. Blurring Retail's 'Digital Divide'

With 225 million smartphone users in the US – and an estimated 272 million by 2018 – mobile customer engagement presents a massive business opportunity.

While most retailers and brands are embracing mobility, there is plenty of room for improvement across a wide range of applications – everything from customer acquisition and loyalty through the use of mobile apps, to mobile Web and mobile marketing.

Merging Mobile with Brick-and-Mortar

Here are several trends at the cutting edge of the 2015 mobile customer experience:

Organizational Alignment. Consumer shopping has changed more in the last five years than it did in the previous 150. As a result, the divide is disappearing between the digital

and brick-and-mortar experiences – and the industry is transitioning from a merchandising point of view to a customer-centric point of view.

Infrastructure Readiness. Infrastructure needs to constantly evolve to keep pace with this transition. Back-end core processes, such as order management, inventory and dynamic pricing, need to be addressed in order to enable real-time consumer demand, 'click and collect,' one-hour delivery, cross-selling, etc.

According to Staples, 13% of its mobile orders are now designated for store pickup. Without a seamlessly connected back end, it would be impossible to meet such expanding customer expectations. Infrastructure readiness is an essential requirement for Staples to stay on top of the demands being driven by its mobile consumers.

Loyalty vs. Price. Today's consumer belongs to an average of 18 loyalty programs, just one example of the difficulty retailers face in differentiating their offerings.

Mobile loyalty programs in industries like groceries, retail, travel, transportation and restaurants help create frictionless engagement, even as they gather data to target high-value customers.

At the same time, consumers have an insatiable demand for receiving products quickly and at the lowest price – and mobile is having a huge impact on pricing strategies here. Amazon remains the absolute master of the art of retail pricing, as it monitors the behavior of shoppers and competitors alike to make decisions on raising or lowering prices.

What's Hot in 2015

Today, businesses are tracking and shaping the mobile shopping journey before, during and after the purchase. Moreover, those first to market with immersive mobile experiences are gaining the advantage.

Here are three major forces having a disruptive impact on mobile retail shopping for 2015.

1. Insight-Driven Experiences – Businesses must not only know their customers, they must also be able to orchestrate their experience throughout the customer journey.

Along with analytics and 'big data,' retailers are embracing tools to optimize the shopping lifecycle and engage customers across the digital and physical worlds.

It's not just knowing when to communicate, but also the interactions a consumer most prefers – like mobile chat, text, Twitter, etc.

Vendors such as SAP, EngageCX, IrisMobile and MomentFeed now employ a range of approaches to identify customers via digital conversations, engage them across the shopping journey and provide authentic local voices for brands that engage consumers according to location.

2. Beacons that Provide More than Just a Generic Coupon Offer – Beacons and Wi-Fi geofences enable shoppers to more easily discover relevant information, such as local content and services.

When you add intelligence to the mix, the future of retail lies with the aggregated learning of behaviors and preferences to ensure relevant customer interaction.

Geolocation-enabled mobile platforms change the shopping experience based on proximity. The outdoor or indoor experience becomes a huge learning opportunity, with mobile apps displaying personalized location information, product information, pop-up coupons, video demonstrations and more.

In this regard, real-time interaction that combines where and when customers enter a store along with past purchasing behavior becomes critical to mobile personalization initiatives. Vendors to watch in this space are Symphony EYC, Zebra Technologies, Aerohive Networks, Aruba Networks, Gimbal and Cisco.

3. Sales Associate CRM for In-Store Engagement – 'Clienteling' is a sales strategy to increase the volume and frequency of in-store shopping through the deployment of 360-degree customer views and sales tools to sales associates.

Mobile CRM platforms are thereby becoming the centerpiece of many mobile engagement strategies.

Retail stores need to empower their front-line sales associates with the right information at the right time. Companies such as Fujitsu, GPShopper, Hybris, TimeTrade and IBM all provide unique approaches to this space.

It's 2015, and the retail industry is massively engaged in rethinking the customer experience, along with leveraging new technologies to address the 'digital divide' between the mobile and in-store experience.

Whether it be infrastructure readiness, increasingly personalized information, location-based services or empowering front-line associates, the merging of mobile with brick-and-mortar provides an unprecedented opportunity for businesses to transform the customer experience.

XVIII. Datacenter Power Efficiency: It's Not the Only Goal

451 Research's sister company Uptime Institute recently released the findings of its fourth annual Data Center Industry Survey.

The results covered a wide range of datacenter issues, including budgets, IT efficiency, and the relationship between company-owned and third-party datacenters. A total of 1,000 datacenter operators and senior managers participated.

The survey shows that progress has been made in curbing datacenter power and cooling inefficiencies, but at the same time, relatively few organizations have improved the way their IT equipment is deployed and managed.

Approximately half of the end-user respondents work for third-party commercial datacenter companies (colocation or cloud computing providers), and the other half work for enterprises in verticals such as financial services (11%), manufacturing (7%), healthcare (4%), government (4%) and other industries (26%).

IT efficiency: PUE – the datacenter industry's white whale?

In recent years, Power Usage Effectiveness (PUE) has been seen as a primary measure of datacenter efficiency. But today, enterprise IT executives appear overly focused on the measure.

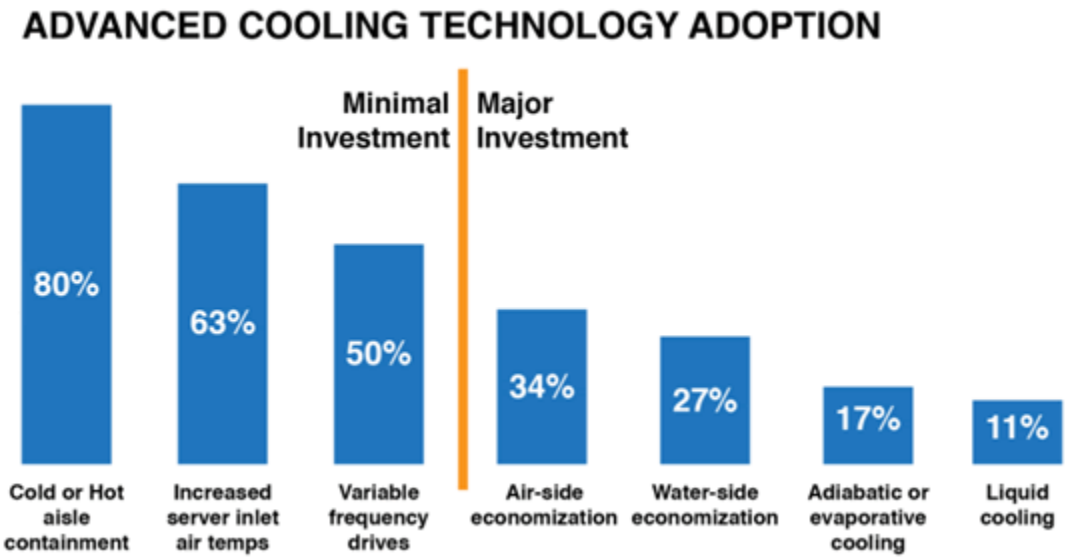
Three out of four respondents report that their datacenter teams use PUE to capture baseline data and track efficiency improvements to their facility.

But at the same time, the PUE metric is being increasingly misused in the rush to cut costs. Moreover, Uptime finds that using PUE as a corporate strategic indicator can be distracting in the long term.

Back in a 2007 survey, Uptime found an average PUE of 2.50. By 2011, the average PUE had improved to 1.89. But since then, the average PUE has only improved by a slight margin to 1.7.

So with the biggest efficiency gains having happened five years ago, datacenters now face a significant investment if they want to make further improvements – along with diminishing returns.

The Uptime survey looked at the adoption of various datacenter-cooling approaches to improve efficiency, and found datacenter operators largely employing low-cost approaches such as *cold/hot aisle containment* (80%) and *increased server inlet air temperatures* (63%).



That said, datacenter operators are under continuing executive pressure to further reduce their PUE. And additional reductions often require high-cost investments in technologies along with design approaches that may not substantially improve systemic IT inefficiencies.

In sum, by overly focusing on PUE, IT executives risk spending too much capital and effort on diminishing returns, while ignoring other underlying drivers of poor IT utilization.

Ignoring the zombies

Today, an estimated one out of five datacenter servers are obsolete, outdated or unused. Nonetheless, few survey respondents believe their company's server populations include comatose machines, and nearly half have no scheduled audits to identify and remove unused hardware.

One reason for this: less than 20% of companies say their IT departments pay the datacenter power bill. Instead, the vast majority allocate the cost to their facilities budget – a lopsided financial arrangement that fosters unaccountable IT growth, inaccurate planning and waste.

There is hope, however. Barclays, for example, has removed nearly 15,000 servers over the past two years, and saved more than $10m in the process. This is but one of many organizational initiatives that are improving datacenter energy efficiency and having a huge impact on the bottom line.

According to Uptime, the crux of today's datacenter efficiency challenge lies in *addressing IT inefficiencies* rather than relentlessly pursuing physical infrastructure inefficiencies.

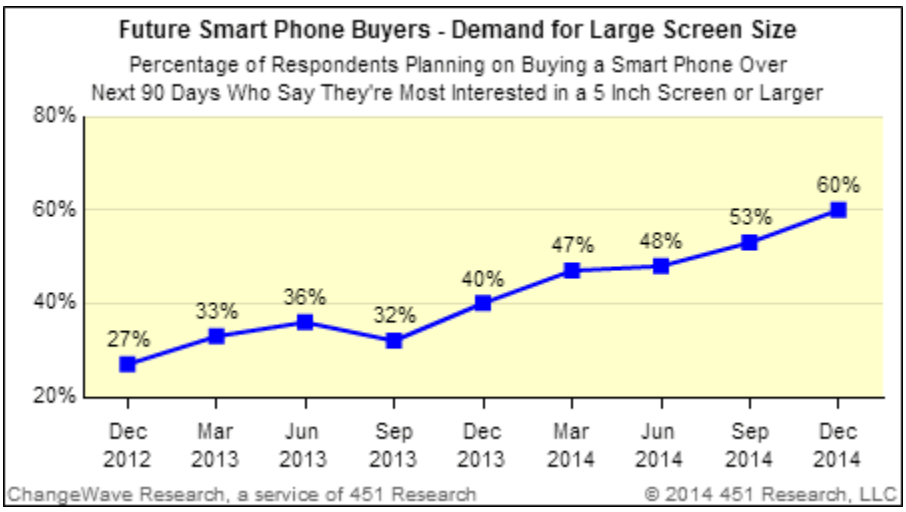
Organizations need to hold their IT operations teams accountable to root out inefficiencies, of which comatose servers are one obvious and egregious example.

Such improvements will also require increased adoption of datacenter management tools that can power-manage IT and control workloads and applications to improve efficiency.

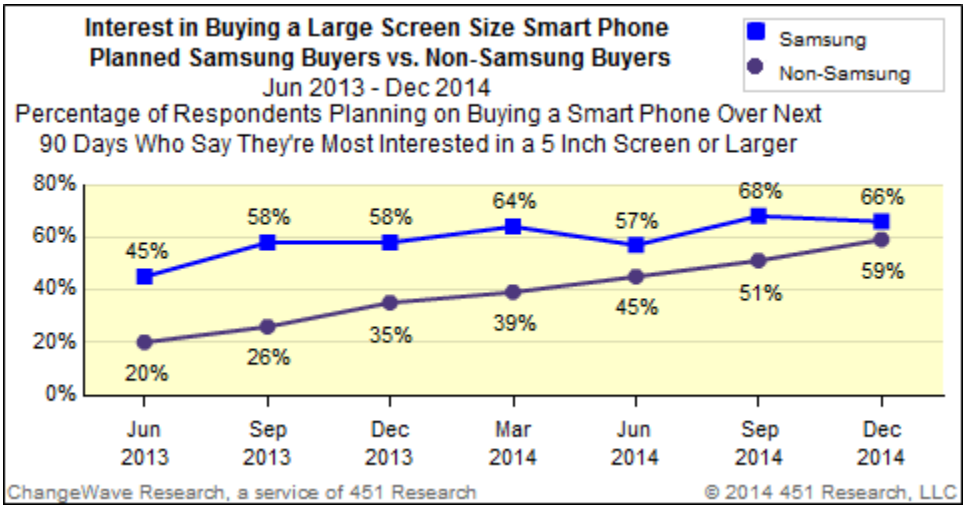
XIX. Surging Demand for Big-Screen Smartphones

A 451 Research ChangeWave smartphone survey of 4,126 consumers found that demand for large-screen devices has surged to a new all-time high.

Three out of five (60%) planned smartphone buyers over the next 90 days say they prefer a 5in screen or larger – a seven-point jump in demand since September 2014, and double the level 15 months ago.

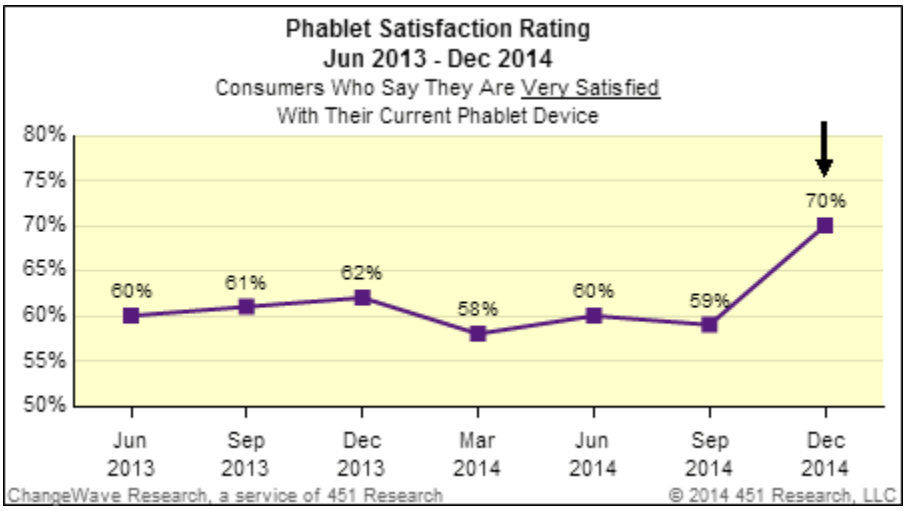


Samsung continues to lead in this space – with two-thirds (66%; down two points) of planned Samsung buyers saying they're most interested in purchasing a 5in screen or larger device.



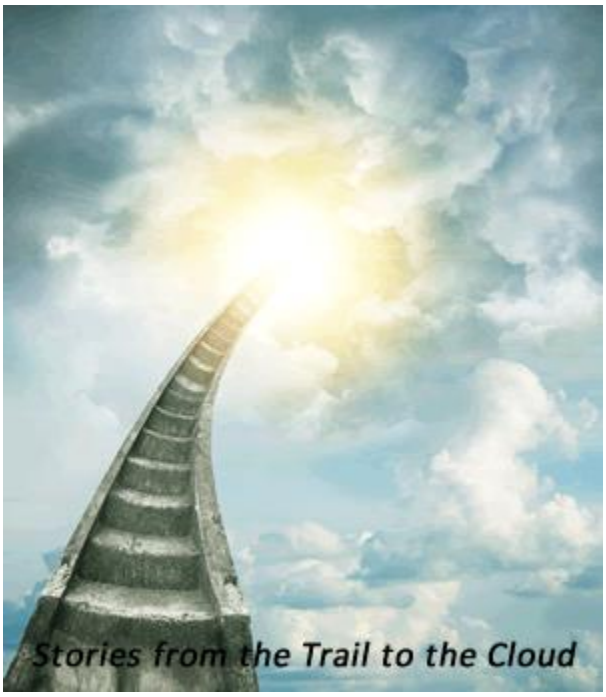
But at the same time, non-Samsung buyer interest in purchasing a large-screen phone (59%) has climbed eight points since September. Apple's release of its first phablet device – the iPhone 6 Plus – is clearly driving this momentum.

In another positive for large-screen phones, satisfaction among phablet owners is at its highest level ever in a ChangeWave survey – with 70% reporting that they're *Very Satisfied* with their device.



Once again, this 11-point increase in large part reflects a favorable rating for the Apple iPhone 6 Plus.

XX. Enterprise Leaders Sound Off on the Cloud



In today's always-on, always-connected economy, virtually every business is digital and relies on a backbone of digital infrastructure.

For the 500+ delegates attending 451 Research Executive IT Summits last year, a common theme rang throughout:

Every company is on a journey to the cloud in one way or another.

The transition to the cloud brings technical and organizational challenges that are much harder to resolve than to simply talk about. The 451 Summits, however, provide a unique opportunity for delegates to see where the industry is going and enterprise challenges lie.

Here are some insights provided by delegates during the deep-dive sessions at two recent 451 Summits – one hosted in the US and one in the UK. The theme for both was finding the right digital infrastructure execution venue for enterprise workloads.

Note that virtualization, colocation, on-premises private cloud and private dedicated hosting are all considerations when selecting the best execution venues for business workloads.

US Cloud Executive IT Summit

The New York summit attracted IT leaders from a range of firms, including Morgan Stanley, Citigroup, Merck, Marvel Entertainment and Omnicom. Key insights from the deep think tanks included:

- *Software-defined everything* – As one delegate put it, 'software-defined everything' is a bandwagon term, but the trend is real and promises to bring programmability, predictability and hardware independence to storage and networking infrastructure.

- *OpenStack* – As of yet, no delegates reported that they had OpenStack in production or in test and development phases. The question for many is how and when to make the move. A delegate with 3,000 VMs and five fulltime employees wondered if he could expect improved cost efficiencies with OpenStack. The current consensus: no way at present given the cost of entry, particularly the cost of training and new hires to manage OpenStack.

- *DevOps in the cloud* – Delegates pointed out that DevOps has the typical early markings of a new buzzword category – namely a lack of standards and a common definition.

Containers – especially Docker – are in the driver's seat in terms of managing the move away from legacy environments and into the cloud.

London Cloud Executive IT Summit

The London summit hosted IT leaders from HSBC, UBS, Lloyds Banking Group, Rabobank, the Home Office department of the UK government and Virgin Money, among others. Participants identified best practices and unmet needs on a variety subjects, including:

- *When and where cloud-based data processing makes sense:* There's strong industry interest in data processing in the cloud. Delegate companies are predominantly using Amazon Web Services at present for testing and development. The UK government's G-cloud was also cited because it enables them to move away from relying on the big system integrators.

  The obstacles to cloud-based data processing include response time, security and the ability to link on-premises assets to analytic services already running in the cloud.

- *Controlling the cloud*: Security is a big consideration in moving to the cloud – just how 'secure' is your data, and who can access it? The two biggest challenges for delegates are how to secure data both 'at rest' and 'in motion.'

  When data is transferred outside a secure network, it becomes more exposed to risk. And as cloud service providers do not understand their customers' data well enough to decide where it should go, end-user vendors have to be responsible to exercise control.

Virtually every company is on a journey to the cloud in one way or another, so it's imperative to sometimes take a step back and compare notes from the road. The 451 executive IT summits provide a great opportunity for delegates to compare notes and share best practices as they steer their organizations' digital infrastructure plans into the future.